

# PATENT ABSTRACTS OF JAPAN

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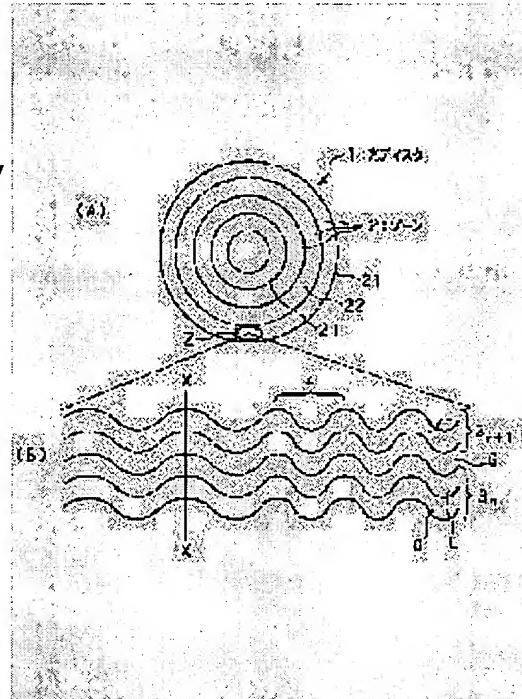
(22)Date of filing : 30.09.1998 (72)Inventor : AOKI IKUO

## (54) OPTICAL DISK

### (57)Abstract:

**PROBLEM TO BE SOLVED:** To provide an optical disk utilizing the physical format system, which is suitable for handling data of large quantity and also capable of easily securing the interchangeability with a ROM optical disk.

**SOLUTION:** As the physical format constitution of the rewritable optical disk or the write-once optical disk, a spiral track for recording the information in the radial direction of the optical disk 1 or for reproducing the recorded information is divided to optional plural zones 21-2i (i is natural number). The track is formed so as to wobble in the radial direction of the disk. Track grooves are formed while superimposing the zone address to the wobble for each of the zones 21-2i based on the optional modulating method.



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application converted registration]

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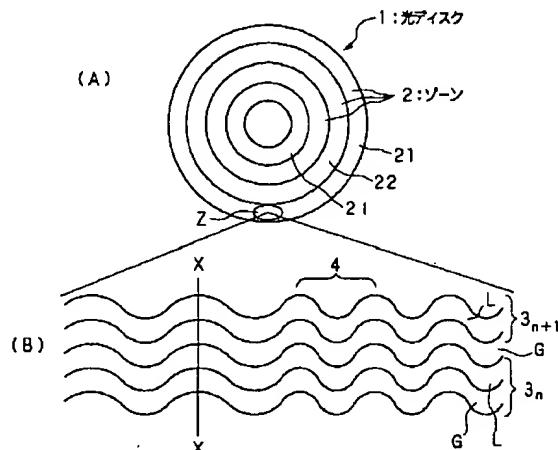
FF24 GG03 GG27

(54)【発明の名称】 光ディスク

(57)【要約】

【課題】大容量データを扱うのに適し、かつ再生専用型光ディスクとの互換性を容易に確保できる物理フォーマット形式の光ディスクを提供すること。

【解決手段】書き換え型光ディスク、またはライトワーン型光ディスクの物理フォーマット構成として光ディスク1の半径方向に情報を記録し、あるいは記録された情報を再生するための螺旋状のトラックを任意の複数のゾーン21~2i (iは自然数)に分割する。上記トラックをディスクの半径方向に蛇行 (ウォブル) するよう形成する。各ゾーン21~2i毎にゾーンアドレスを任意の変調方式に基づいてウォブルに重畳させながらトラック溝を形成する。



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CLAIMS

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[Claim(s)]

[Claim 1] It has a spiral truck for reproducing the information which recorded information or was recorded. In write once optical disks, such as erasable optical disks, such as a phase change medium which comes to carry out zoning of this truck to radial, and MO medium, or a pigment system medium. The optical disk characterized by being formed so that said truck may lie in a zigzag line in radial [ of said disk ] (wobble), and forming said truck so that the zone address may be superimposed and recorded on said wobble based on the modulation regulation of arbitration for said each [ which was divided ] zone of every.

[Claim 2] The optical disk according to claim 1 characterized by forming said wobble under the condition by which the roll control is carried out with the CAV (Constant Angular Velocity) method at least in each zone.

[Claim 3] The optical disk according to claim 2 characterized by recording data on both the land of said truck, and the groove section.

[Claim 4] The optical disk according to claim 1 to 3 characterized by making the smallest unit of file management into said zone unit.

[Claim 5] The optical disk according to claim 4 characterized by \*\*\*\*\* of arbitration being recorded by the remaining non-record section unnecessary for record of the data in the zone of this arbitration in case data are recorded on the zone of arbitration.

[Claim 6] Optical disk according to claim 1 to 5 characterized by setting the number of partitions of said zone as arbitration according to the class of data to treat .

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## DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the postscript (write-once) mold optical disk using an erasable optical disk, a pigment system medium, etc. which used the phase change medium, MO (optical MAG) medium, etc.

[0002]

[Description of the Prior Art] DVD (digital video disc) is produced commercially as a mass storage to a computer etc. In the optical disk used for DVD, a user memorizes beforehand. There is a postscript (write-once) mold optical disk using the erasable optical disk using DVD-ROM (read-only memory) which reads the data carried out, a phase change medium, MO (optical MAG) medium by which a user like DVD-RAM (memory which can be read-out written in) can write in data, etc., the pigment system medium which can write in a one time.

[0003]

[Problem(s) to be Solved by the Invention] However, the physical formats in the storage region of DVD-RAM and DVD-ROM which were mentioned above differ at the point shown below. In order that DVD-RAM may manage non-assigned space, the ID (Identification) section which shows a sector address is preformatted into the head for every sector. Moreover, in order to store data in the both sides of a land truck and a groove truck to DVD-RAM, this ID section is arranged alternately.

[0004] Thus, DVD-RAM has the need of managing a storage region, in order to rewrite data, and this function manager is added, it has complicated format composition, and physical format configurations differ greatly to DVD-ROM. For this reason, there is no compatibility in the physical format configuration of DVD-ROM and DVD-RAM, and detection actuation of the address for reading data etc. has the need of corresponding so that it can both reproduce by the drive equipment side.

[0005] It aims at offering the optical disk of the physical format format that this invention is made in view of such a situation, and it is suitable for treating mass data, such as image data and voice data, especially in the write-once mold optical disk using the erasable optical disk using a phase change medium, MO medium, etc., or a pigment system medium, and compatibility with the mold optical disk only for playbacks can be secured easily.

[0006]

[Means for Solving the Problem] In order to attain the above-mentioned purpose invention according to claim 1 It has a spiral truck for reproducing the information which recorded information or was recorded. In write once optical disks, such as erasable optical disks, such as a phase change medium which comes to carry out zoning of this truck to radial, and MO medium, or a pigment system medium It is characterized by being formed so that said truck may lie in a zigzag line in radial [ of said disk ] (wobble), and forming said truck so that the zone address may be superimposed and recorded on said wobble based on the modulation regulation of arbitration for said each [ which was divided ] zone of every.

[0007] Moreover, invention according to claim 2 is characterized by forming said wobble under the

condition by which the roll control is carried out with the CAV (Constant Angular Velocity) method at least in each zone.

[0008] Moreover, invention according to claim 3 is characterized by recording data on both the land of said truck, and the groove section in an optical disk according to claim 2.

[0009] Moreover, invention according to claim 4 is characterized by making the smallest unit of file management into said zone unit in an optical disk according to claim 1 to 3.

[0010] Moreover, in an optical disk according to claim 4, in case invention according to claim 5 records data on the zone of arbitration, it is characterized by \*\*\*\*\* of arbitration being recorded by the remaining non-record section unnecessary for record of the data in the zone of this arbitration.

[0011] Moreover, invention according to claim 6 is characterized by setting the number of partitions of said zone as arbitration according to the class of data to treat in an optical disk according to claim 1 to 5.

[0012]

[Embodiment of the Invention] Hereafter, the gestalt of operation of this invention is explained to a detail with reference to a drawing. The configuration of the optical disk concerning the gestalt of operation of the 1st of this invention is shown in drawing 1. In drawing 1 (A), optical disks 1 are write-once mold optical disks, such as erasable optical disks, such as a phase change medium and MO medium, or a pigment system medium. The spiral truck for recording information on radial [ of an optical disk 1 ] as a physical format configuration of these erasable optical disks or a write-once mold optical disk, or reproducing the recorded information is divided into two or more zones 21-2i (i is the natural number) of arbitration.

[0013] Moreover, the above-mentioned truck is formed so that it may move in a zigzag direction a predetermined period in radial [ of a disk ] (it is hereafter described as a wobble). And a truck slot is formed, making a wobble superimpose the zone address based on the modulation technique of arbitration on each zone 21 - every 2i. Naturally, in each zone, it is the same zone address. As a modulation technique of arbitration, FM modulation used for CD-R etc. is used here, for example. Of course, it is satisfactory even if it is other modulation techniques.

[0014] Drawing 2 (B) expands and shows the field Z in the zone 21 of the optical disk 1 shown in drawing 1 (A). It is formed in Field Z as are shown in this drawing, and a wobble carried out in truck 3n and 3n+1 to radial [ of a disk 1 ] a predetermined period. 4 is a wobble. Each truck consists of the groove sections G formed in land L formed in convex, and a concave. Drawing 2 shows the cross-section structure by the X-X cutting plane line of drawing 1 (B) in the field Z of an optical disk 1.

[0015] Moreover, with the gestalt of this operation, in case a truck slot is formed making the zone address of each zone superimpose on the above-mentioned wobble based on the modulation technique of arbitration, at least in each zone, the above-mentioned truck slot is formed under the condition in which the roll control is carried out by the disk driving gear with the CAV (Constant Angular Velocity) method. By doing in this way, the modulation pattern of the wobble of adjoining trucks becomes the same in all the fields in a zone. Therefore, it becomes possible to detect the modulation data of a wobble without the cross talk from an adjoining truck, also in any of the land of a truck, and the groove section.

[0016] Furthermore, with the gestalt of this operation, since the above-mentioned wobble is in phase by adjoining truck, the width of face of a land and the groove section is held uniformly and both a land and the groove section can secure a fixed track pitch, data are recordable on both the land of a truck, and the groove section.

[0017] What is necessary is just to perform file management by making the smallest unit of file management into a zone unit, in case data are recorded on the formatted optical disk 1, as mentioned above. In the system treating especially mass data, such as image data and voice data, file management can become easy, a system with very high operability can be built, and it can be said that it is a very effective format configuration.

[0018] The configuration of the optical disk concerning the 2nd operation gestalt of this invention is shown in drawing 3. The optical disk which differing from the optical disk concerning the gestalt of this operation and the optical disk concerning the 1st operation gestalt constitutionally requires for the

gestalt of this operation is the point set as arbitration according to the class of data treating the number of partitions of a zone, and the explanation which overlaps since other configurations are the same is omitted.

[0019] If it prepares the optical disk 20 of a format configuration with more number of partitions of a zone 2 in preparing the optical disk 10 which the number of partitions of a zone 2 considered as little format configuration as shown in drawing 3 (A) and mainly treating common code data, since one file is large when mainly treating image data in drawing 3, a system with high use effectiveness can be built. Thus, if two or more kinds of optical disks with which the numbers of partitions of a zone differ according to the class of data to treat are prepared, an ideal format property will be acquired.

[0020] Moreover, when the remaining non-record section of one or less zone unnecessary for record of the data in the zone of the arbitration is generated [ when recording data on the zone of the arbitration of an optical disk ], the fixed data of arbitration are recorded on the non-record section. As specifically shown in drawing 4, in case data DAT A1 is recorded on an optical disk, it constitutes so that the fixed data of arbitration may be recorded together in the non-record section URA which does not record the data in the zone Zn which is the last zone of the record sections of data DAT A1. And in case the new data DAT A2 is recorded after that, it constitutes so that zone Zn+1 to the record next to Zone Zn may be started.

[0021] Thus, in the optical disk applied to the gestalt of this operation by constituting, since between the newly recorded data did not break off and the data recorded before are followed, compatibility is securable to the physical format that whose data are continuously formed like the optical disk of the mold only for playbacks it is a major premise.

[0022]

[Effect of the Invention] It has a spiral truck for reproducing the information which recorded information or was recorded according to invention according to claim 1, as explained above. In write once optical disks, such as erasable optical disks, such as a phase change medium which comes to carry out zoning of this truck to radial, and MO medium, or a pigment system medium It is formed so that said truck may lie in a zigzag line by the wobble of a predetermined period in radial [ of said disk ]. And since said truck is formed so that the zone address may be superimposed and recorded on said wobble based on the modulation regulation of arbitration for said each [ which was divided ] zone of every Since file management of said truck can be performed per zone, the physical format suitable for the mass optical disk of a very easy and cheap configuration is realizable.

[0023] It becomes possible [ a land and the groove section ] to detect the zone address information on which a wobble is overlapped, without being influenced of the cross talk from an adjoining truck, since said wobble is formed under the condition by which the roll control is carried out with the CAV (Constant Angular Velocity) method at least in each zone according to invention according to claim 2.

[0024] Moreover, since it is in phase by truck by which a wobble adjoins, the width of face of a land and the groove section is always held uniformly, and both a land and the groove section become possible [ securing a fixed track pitch ].

[0025] Since according to invention according to claim 3 it is constituted so that data may be recorded on both the land of said truck, and the groove section, track density can be made high and the physical format of the optical disk suitable for large capacity-ization can be realized.

[0026] According to invention according to claim 4, since the smallest unit of file management was made into said zone unit, when treating mass data, such as image data and voice data, a system with very high operability can be built.

[0027] Since according to invention according to claim 5 it constituted so that the fixed data of arbitration might be recorded on the remaining non-record section unnecessary for record of the data in the zone of this arbitration when recording data on the zone of arbitration, in order to continue without between the data newly recorded with the data already recorded breaking off, it becomes possible to secure easily compatibility with the physical format of the mold optical disk only for playbacks.

[0028] Since the number of partitions of said zone is set as arbitration according to the class of data to treat according to invention according to claim 6, it becomes possible [ applying not only to the system

treating mass data, such as image data and voice data, but to the system treating common code data etc. ].

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TECHNICAL FIELD

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[Field of the Invention] This invention relates to the postscript (write-once) mold optical disk using an erasable optical disk, a pigment system medium, etc. which used the phase change medium, MO (optical MAG) medium, etc.

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PRIOR ART

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[Description of the Prior Art] DVD (digital video disc) is produced commercially as a mass storage to a computer etc. In the optical disk used for DVD, a user memorizes beforehand. There is a postscript (write-once) mold optical disk using the erasable optical disk using DVD-ROM (read-only memory) which reads the data carried out, a phase change medium, MO (optical MAG) medium by which a user like DVD-RAM (memory which can be read-out written in) can write in data, etc., the pigment system medium which can write in a one time.

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## EFFECT OF THE INVENTION

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[Effect of the Invention] As explained above, according to invention according to claim 1, it has a spiral truck for reproducing the information which recorded information or was recorded, and carry out zoning of this truck to radial. In write once optical disks, such as erasable optical disks, such as a becoming phase change medium and MO medium, or a pigment system medium It is formed so that said truck may lie in a zigzag line by the wobble of a predetermined period in radial [ of said disk ]. And since said truck is formed so that the zone address may be superimposed and recorded on said wobble based on the modulation regulation of arbitration for said each [ which was divided ] zone of every Since file management of said truck can be performed per zone, the physical format suitable for the mass optical disk of a very easy and cheap configuration is realizable.

[0023] It becomes possible [ a land and the groove section ] to detect the zone address information on which a wobble is overlapped, without being influenced of the cross talk from an adjoining truck, since said wobble is formed under the condition by which the roll control is carried out with the CAV (ConstantAngular Velocity) method at least in each zone according to invention according to claim 2.

[0024] Moreover, since it is in phase by truck by which a wobble adjoins, the width of face of a land and the groove section is always held uniformly, and both a land and the groove section become possible [ securing a fixed track pitch ].

[0025] Since according to invention according to claim 3 it is constituted so that data may be recorded on both the land of said truck, and the groove section, track density can be made high and the physical format of the optical disk suitable for large capacity-ization can be realized.

[0026] According to invention according to claim 4, since the smallest unit of file management was made into said zone unit, when treating mass data, such as image data and voice data, a system with very high operability can be built.

[0027] Since according to invention according to claim 5 it constituted so that the fixed data of arbitration might be recorded on the remaining non-record section unnecessary for record of the data in the zone of this arbitration when recording data on the zone of arbitration, in order to continue without between the data newly recorded with the data already recorded breaking off, it becomes possible to secure easily compatibility with the physical format of the mold optical disk only for playbacks.

[0028] Since the number of partitions of said zone is set as arbitration according to the class of data to treat according to invention according to claim 6, it becomes possible [ applying not only to the system treating mass data, such as image data and voice data, but to the system treating common code data etc. ].

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**TECHNICAL PROBLEM**

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[Problem(s) to be Solved by the Invention] However, the physical formats in the storage region of DVD-RAM and DVD-ROM which were mentioned above differ at the point shown below. In order that DVD-RAM may manage non-assigned space, the ID (Identification) section which shows a sector address is preformatted into the head for every sector. Moreover, in order to store data in the both sides of a land truck and a groove truck to DVD-RAM, this ID section is arranged alternately.

[0004] Thus, DVD-RAM has the need of managing a storage region, in order to rewrite data, and this function manager is added, it has complicated format composition, and physical format configurations differ greatly to DVD-ROM. For this reason, there is no compatibility in the physical format configuration of DVD-ROM and DVD-RAM, and detection actuation of the address for reading data etc. has the need of corresponding so that it can both reproduce by the drive equipment side.

[0005] It aims at offering the optical disk of the physical format format that this invention is made in view of such a situation, and it is suitable for treating mass data, such as image data and voice data, especially in the write-once mold optical disk using the erasable optical disk using a phase change medium, MO medium, etc., or a pigment system medium, and compatibility with the mold optical disk only for playbacks can be secured easily.

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## MEANS

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[Means for Solving the Problem] In order to attain the above-mentioned purpose invention according to claim 1 It has a spiral truck for reproducing the information which recorded information or was recorded. In write once optical disks, such as erasable optical disks, such as a phase change medium which comes to carry out zoning of this truck to radial, and MO medium, or a pigment system medium It is characterized by being formed so that said truck may lie in a zigzag line in radial [ of said disk ] (wobble), and forming said truck so that the zone address may be superimposed and recorded on said wobble based on the modulation regulation of arbitration for said each [ which was divided ] zone of every.

[0007] Moreover, invention according to claim 2 is characterized by forming said wobble under the condition by which the roll control is carried out with the CAV (Constant Angular Velocity) method at least in each zone.

[0008] Moreover, invention according to claim 3 is characterized by recording data on both the land of said truck, and the groove section in an optical disk according to claim 2.

[0009] Moreover, invention according to claim 4 is characterized by making the smallest unit of file management into said zone unit in an optical disk according to claim 1 to 3.

[0010] Moreover, in an optical disk according to claim 4, in case invention according to claim 5 records data on the zone of arbitration, it is characterized by \*\*\*\*\* of arbitration being recorded by the remaining non-record section unnecessary for record of the data in the zone of this arbitration.

[0011] Moreover, invention according to claim 6 is characterized by setting the number of partitions of said zone as arbitration according to the class of data to treat in an optical disk according to claim 1 to 5.

[0012]

[Embodiment of the Invention] Hereafter, the gestalt of operation of this invention is explained to a detail with reference to a drawing. The configuration of the optical disk concerning the gestalt of operation of the 1st of this invention is shown in drawing 1 . In drawing 1 (A), optical disks 1 are write-once mold optical disks, such as erasable optical disks, such as a phase change medium and MO medium, or a pigment system medium. The spiral truck for recording information on radial [ of an optical disk 1 ] as a physical format configuration of these erasable optical disks or a write-once mold optical disk, or reproducing the recorded information is divided into two or more zones 21-2i (i is the natural number) of arbitration.

[0013] Moreover, the above-mentioned truck is formed so that it may move in a zigzag direction a predetermined period in radial [ of a disk ] (it is hereafter described as a wobble.). And a truck slot is formed, making a wobble superimpose the zone address based on the modulation technique of arbitration on each zone 21 - every 2i. Naturally, in each zone, it is the same zone address. As a modulation technique of arbitration, FM modulation used for CD-R etc. is used here, for example. Of course, it is satisfactory even if it is other modulation techniques.

[0014] Drawing 2 (B) expands and shows the field Z in the zone 21 of the optical disk 1 shown in drawing 1 (A). It is formed in Field Z as are shown in this drawing, and a wobble carried out in truck 3n

and  $3n+1$  to radial [ of a disk 1 ] a predetermined period. 4 is a wobble. Each truck consists of the groove sections G formed in land L formed in convex, and a concave. Drawing 2 shows the cross-section structure by the X-X cutting plane line of drawing 1 (B) in the field Z of an optical disk 1. [0015] Moreover, with the gestalt of this operation, in case a truck slot is formed making the zone address of each zone superimpose on the above-mentioned wobble based on the modulation technique of arbitration, at least in each zone, the above-mentioned truck slot is formed under the condition in which the roll control is carried out by the disk driving gear with the CAV (Constant Angular Velocity) method. By doing in this way, the modulation pattern of the wobble of adjoining trucks becomes the same in all the fields in a zone. Therefore, it becomes possible to detect the modulation data of a wobble without the cross talk from an adjoining truck also in any of the land of a truck, and the groove section. [0016] Furthermore, with the gestalt of this operation, since the above-mentioned wobble is in phase by adjoining truck, the width of face of a land and the groove section is held uniformly and both a land and the groove section can secure a fixed track pitch, data are recordable on both the land of a truck, and the groove section.

[0017] What is necessary is just to perform file management by making the smallest unit of file management into a zone unit, in case data are recorded on the formatted optical disk 1, as mentioned above. In the system treating especially mass data, such as image data and voice data, file management can become easy, a system with very high operability can be built, and it can be said that it is a very effective format configuration.

[0018] The configuration of the optical disk concerning the 2nd operation gestalt of this invention is shown in drawing 3. The optical disk which differing from the optical disk concerning the gestalt of this operation and the optical disk concerning the 1st operation gestalt constitutionally requires for the gestalt of this operation is the point set as arbitration according to the class of data treating the number of partitions of a zone, and the explanation which overlaps since other configurations are the same is omitted.

[0019] If it prepares the optical disk 20 of a format configuration with more number of partitions of a zone 2 in preparing the optical disk 10 which the number of partitions of a zone 2 considered as little format configuration as shown in drawing 3 (A) and mainly treating common code data, since one file is large when mainly treating image data in drawing 3, a system with high use effectiveness can be built. Thus, if two or more kinds of optical disks with which the numbers of partitions of a zone differ according to the class of data to treat are prepared, an ideal format property will be acquired.

[0020] Moreover, when the remaining non-record section of one or less zone unnecessary for record of the data in the zone of the arbitration is generated [ when recording data on the zone of the arbitration of an optical disk ], the fixed data of arbitration are recorded on the non-record section. As specifically shown in drawing 4, in case data DAT A1 is recorded on an optical disk, it constitutes so that the fixed data of arbitration may be recorded together in the non-record section URA which does not record the data in the zone Zn which is the last zone of the record sections of data DAT A1. And in case the new data DAT A2 is recorded after that, it constitutes so that zone Zn+1 to the record next to Zone Zn may be started.

[0021] Thus, in the optical disk applied to the gestalt of this operation by constituting, since between the newly recorded data did not break off and the data recorded before are followed, compatibility is securable to the physical format that whose data are continuously formed like the optical disk of the mold only for playbacks it is a major premise.

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DESCRIPTION OF DRAWINGS

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[Brief Description of the Drawings]

[Drawing 1] The explanatory view showing the configuration of the optical disk concerning the 1st operation gestalt of this invention.

[Drawing 2] The sectional view showing the partial cross-section structure of the optical disk by the X-X cutting plane line in drawing 1.

[Drawing 3] The explanatory view showing the configuration of the optical disk concerning the 2nd operation gestalt of this invention.

[Drawing 4] The explanatory view showing the recording method for securing the compatibility of a physical format between the optical disks with which physical formats differ.

[Description of Notations]

1, 10, 20 Optical disk

2 Zone

3 Truck

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[Translation done.]

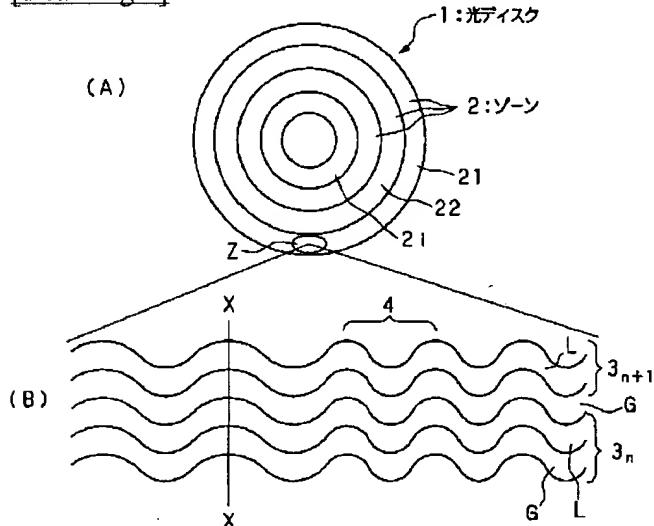
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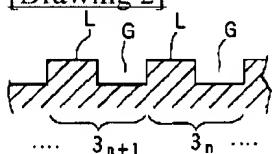
1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. \*\*\*\* shows the word which can not be translated.
3. In the drawings, any words are not translated.

## DRAWINGS

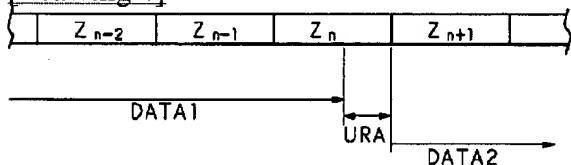
## [Drawing 1]



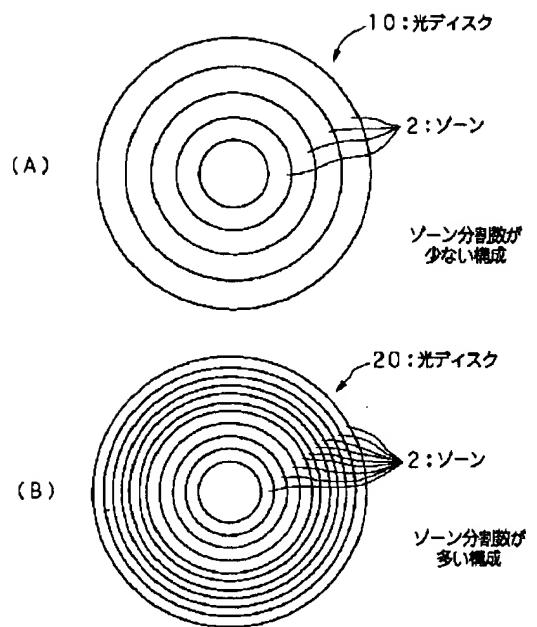
## [Drawing 2]



## [Drawing 4]



## [Drawing 3]



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[Translation done.]